

Amendments to the Specification:

In compliance with revised 37 CFR 1.121, the amendments to the following replacement paragraphs are shown by strikethrough (for deleted matter) and underlining (for added matter).

Please replace the paragraph beginning at page 6, lines 19-26 of Applicant's specification with the following amended paragraph.

b¹

The die pressure needed to maintain the blowing agent in solution depends on the blowing agent selected. The vapor pressure and solubility of the gas in the polymer will determine the needed die pressure to prevent pre-foaming. In the case of polystyrene, for example, one blowing agent that has proven to work well is pentane. At a concentration of about 5%, pentane will typically yield a uniform foam with a ~~specific gravity~~ density of about 0.1 g/cc (i.e., grams per cubic centimeter). The die pressure required to keep this gas in solution is less than 140 bar, which allows a die opening large enough to avoid corrugation. Corrugation occurs when the rate of foam growth exceeds the available geometry. Specifically, the circumference of the growing foam exceeds the circumference geometrically available and the additional length forms a sinusoidal pattern about the center of radial growth. The negative impact of this phenomenon is that the foam will be thicker and thinner in spots across the sheet width and the product made with such foam will have inferior physical properties. Since product thickness, width and basis weight are controlled variables, both the amount of gas needed to attain the desired density reduction (and thereby thickness) and the machine direction speed is fixed. In addition, since foam growth is three-dimensional, the die must be smaller in circumference than the final width of the sheet produced. These constraints therefore allow only limited freedom in geometric configuration. Ideally, the growth in all three dimensions is at a rate of the cube root of the expansion ratio, where the expansion ratio is defined as the final density of the foam divided by the density of the unexpanded melt. Such growth would result in nearly spherical cells and equal strength of the product in each dimension.

Please replace the paragraph at page 7, line 22 to page 8, line 10 of Applicant's specification with the following amended paragraph.

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B² The problem with using ambient gasses to produce polymer foam sheet is therefore complex. These gasses have very high vapor pressures and very low solubility in most polymers. A high die pressure is therefore required to prevent pre-foaming at the gas concentrations required to make low-density foam. For the purpose of this invention, low density foam is defined as foam with a ~~specific gravity~~ density less than 0.15 g/cc. A high die pressure requires a small die gap, which then causes the sheet to corrugate severely and limits the thickness the sheet can attain. Polymer foam sheet produced in accordance with the present invention preferably has a thickness of between about 0.75 mm and about 6 mm, and gauge variation across a width thereof of less than about 5%. Additionally, due to the high vapor pressure of these gasses, the foam reaches its final density very quickly after exiting the die. Again, corrugation will occur as the circumference of the growing sheet is at nearly the final sheet width while the geometric constraint is still near the circumference of the die. Again, as previously discussed, the additional length must be accommodated as a sinusoidal pattern about the center of the circle defining the radial growth. As a result, using ambient gasses exclusively has always resulted in either a product that was inferior due to pre-foaming or corrugation, or both, or a product of limited density reduction produced by limiting the amount of ambient blowing agent to avoid the problems previously described.

Please replace the paragraph at page 13, lines 1-11 of Applicant's specification with the following amended paragraph.

B³ The sample of Example 1 was produced with the annular die 600 of FIG. 6. A male die lip 602 and female die lip 604 create an opening 606. The divergence angle 608 of this die was about 3°, the exiting channel 610 had a length of about 25.4 mm and the exit angle 612 of the die was about 34°. Annular die 600 had exterior (female die) lip air cooling means 614 only, which kept the die at about 60° C. No means of cooling the male die lip was provided on this prototype die. In general, the section of the exiting channel from the smallest cross-sectional point to the exit is preferably kept at a temperature of between about 15° C and about 95° C, and more preferably at a temperature of between about 25° C and about 60° C, this temperature being determined subjectively by the best surface appearance. In addition, the foam produced preferably has a ~~specific gravity~~ density of between about 0.05 g/cc and about 0.15 g/cc, and an average cell diameter of about 0.05 mm to about 1 mm.